

Revised and Enlarged.

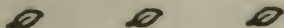
NATIONAL Self Tuner

OR

TUNING MADE PERFECT

BY A

Practical Tuner of Years Experience



Contains Complete Instructions on Tuning and Regulating Pianos, together with a specification of defects and their remedies, for those who wish to know more about the structure or care of their instrument. Illustrated with cuts and examples, etc.

This work is recommended by some of our best tuners and teachers. ✻ ✻ ✻ ✻ ✻ ✻ ✻

It also gives a short and concise treatise on the organ, its preservation, stops and effects, etc. ✻

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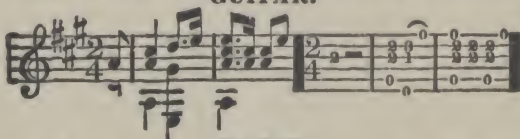
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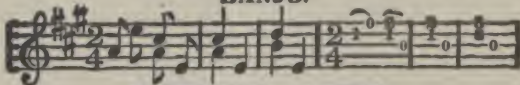
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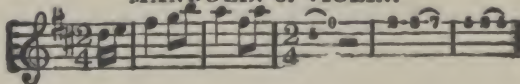
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The
National Self Tuner

—OR—

Tuning Made Perfect

FOR

Amateurs

By a Practical Tuner

PRICE, 30 CENTS.



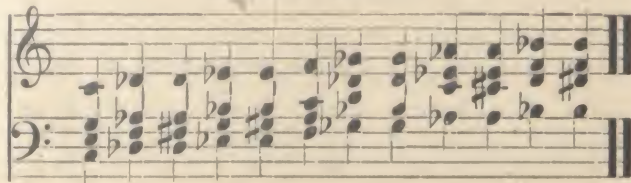
INTERIOR VIEW OF AN UPRIGHT PIANOFORTE.

NATIONAL PIANO TUNER.

Tuning the Pianoforte.

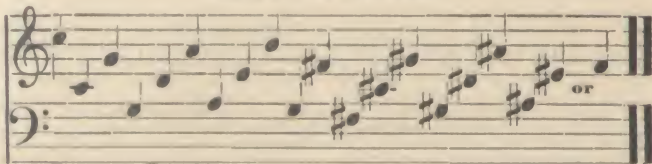
To harmonize a pianoforte is to put the twelve common chords contained in the octave in tune.

COMMON CHORDS.



This may be done by tuning a circle of ascending fifths as follows:

CIRCLE OF FIFTHS.



The remaining portion of the instrument being tuned by octaves.

The foregoing is an easy way, and answers well enough in ordinary tuning. But to harmonize the

twelve chords perfectly by this method is nearly impossible. The sound of the perfect fifth is peculiar; and while seemingly dissonant, is certainly harmonious.

It may be slightly inaccurate and still not be noticeable. And through the circle flatness in one may be compensated by sharpness in another, and thus every chord be more or less deficient.

The major third which enters into the common chord is distinctly dissonant and sharp to its tonic.

Could each third receive an equal portion of sharpness, by this method of tuning by fifths, the instrument would necessary be in tune.

This, however, is equally impossible, as a shade of imperfection in a fifth or third, not appreciable in a separate interval, is always offensively noticable in the common chord.

To attain as nearly as possible perfect harmony, we should tune a series of eight common chords, which will embrace the remaining four.

Process In Tuning the Pianoforte.

Now it may be that very many of our readers never heard of the temperament of a piano before, and we simply say here, that it is the twelve notes beginning with middle C, and ending with the C one octave above, and the difficult thing has always been to get these twelve notes correct. Some tuners use the twelve notes from A below middle C and ending with G sharp above middle C. The operations for both tunings are practically the same.

First tune C above middle C to the fork. Then tune C in its octave below. Next tune G a perfect fifth to the lower C. And adding the upper C, and striking the three together, be certain that it perfectly harmonizes between the two, while it is a perfect fifth to one and a perfect fourth to the other.

Now tune the octave below, carefully, try the C between the two Gs, which stand in the same relation to them as the G did between the other two Cs—*viz.*, a fifth to one and a fourth to the other. Any deficiency will be at once noticed and the G must be altered.

In the same manner test the other fifths, and also the accuracy of octaves.

Next tune E a sharp third to the lower C, and being sure that the dissonance heard is sharpness and not flatness, harmonize it in the whole common chord of C, E, G, C, and its inversion G, C, E, G. If the third is smooth, the chord will harmonize perfectly. If it is not smooth, the entire chord will be imperfect.

As this chord is the foundation of the whole, it must not be left until entirely satisfied of its accuracy.

Next tune F between the two Cs in the same way, being a fifth to the upper C; and being a descending fifth, it must be tuned as sharp as it will bear without being dissonant.

This same rule applies to the ascending fifths, which are as near flatness as may be without being dissonant flat.

Next, the octave below F being tuned, tune A below middle C, a sharp third to F, as the E was to C and harmonize it in the chord of F, A, C, F, which will be found an effective way of securing this A. It must prove a perfect fifth to E, otherwise there is some inaccuracy in the preceding work which must be revised.

Tune the octave above to A and you have the inversion of the common chord of F, *viz.*, C, F, A and F, A, C. Also you have a trial in the chord of A

minor A, C, E, A, which must, of course, be harmonious.

Next tune the D which stands between the two As. It is a fifth to the G below and the A above it. If this does not prove so, it is possible some mistake has been made.

Be careful of octaves and unisons; any deficiency in them must be fatal to your efforts.

Next tune B, the third in the common chord of G. First make it sharp as you did the E, and then harmonize it, preserving its sharpness, in the whole chord of G, B, D, G.

Having tuned the octave below to D, you have an inversion for a trial—*viz.*, D, G, B, G. This trial of inversion will be found very desirable throughout. Tuning the octave above to B, it must prove a perfect fifth to the first E tuned. You now have the chord of the Dominant for a further proof of correctness—*viz.*, D, F, G, B, resolving into G, C, E; or again B D, F, G into C, E, G.

In skillful hands, with a good pianoforte which yields a pure tone, the above trials will always guarantee the result.

Next tune F sharp, the third in the common chord of D, the octave above to the D being first tuned. It must prove a fifth to B below it, and being sharp must like the others, harmonize in the chord D, F sharp, A, D. This being the dominant of G, the last key tuned, of course the chord of the dominant seventh of G is erected on it; thus D base, F sharp major third, A perfect fifth and C a minor seventh, which resolves into

D, G, B; or A, C, D, F sharp into G, B D, G; or F sharp, A, C, D into G, B, D.

Next harmonize the key of A major in the same way, C sharp being the third and F sharp below it a trial fifth.

Next harmonize the key of B major, five sharps. Here D sharp is the third, G sharp below the trial fifth and B, D sharp, F sharp and B the chord. Another chord is now incidentally tuned—*viz.*, A flat, C, E flat and the two thirds are G above and B below, D sharp.

Next tune the key of F sharp major, six sharps. Here A sharp or B flat is the third and the last note to be tuned. The octave above to which being tuned D sharp or E flat, last tuned, is the trial fifth. But this A sharp or B flat must prove a perfect fifth to F above it tuned at the beginning. And if it does so, the proof will no doubt be strong in the mind of most artists that the system here recommended is the correct one.

You now have also the two remaining chords, which make the twelve—*viz.*, B flat, D, F, B flat and E flat, G, B flat and F flat.

The remaining part of the instrument is tuned by octaves, and it is desirable to tune the lower part first. When great accuracy is the aim, it will be found profitable to unite the chord with the octave which is being tuned, even to the extremities of the pianoforte.

The Implements of Tuning.

For the purposes of tuning these are required:

A tune fork, C or A, or both

A tuning hammer **T** shaped, or one of crank shape, called a crank or lever. It is desirable to possess both as the pins on different pianos are not of the same shape. In most modern pianos the pins are stiff to turn, and the crank affords greater leverage for the hand.

Certain wedges are required to damp strings adjacent to the one that is being tuned.

A "Grand" wedge of triangular section; usually made of lead covered with leather, and a stick wedge about nine inches in length, both ends have properly prepared covering of felt and leather.

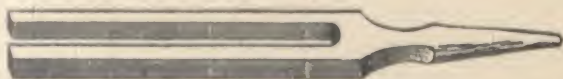
A pair of cutting pliers, the flat-nosed kind. In the event of breaking strings it is necessary to have something of the kind. The cutters are expensive, but any ordinary pliers may answer the purpose, only that then a small file will be required to nick the steel wire, which will permit the breaking of the wire at the desired length as efficiently as cutting it with pliers.

These implements may be purchased at any music warehouse.

Below are shown cuts of the tuning hammer, tuning fork and pitch pipe.



TUNING HAMMER.



TUNING FORK.



PITCH PIPE.

In piano tuning, however, a fork is preferable to a tuning or pitch pipe.

Remarks on Concert Pitch.

Concert pitch is not altogether definite.

Forks, flutes and pitch pipes may vary half a note, and the present concert or opera pitch is considerable higher than formerly.

To tune an old pianoforte, therefore, to concert pitch might not only endanger the instrument itself as well as the strings, but would prevent its remaining in tune. Modern pianofortes, however, which are of much stronger construction, are expected to stand at concert pitch.

If, however, any pianoforte is found much depressed or below pitch, it will require several tunings, at intervals of several days, before it can be expected to remain in tune at concert pitch.

In this case a series of ascending perfect fifths, as seen in the foregoing, may be found the quickest method, reserving the one last treated for the final tuning.

Practical Application of the Art of Tuning.

The amateur tuner or student who desires to do his own tuning will do well to carefully study the following suggestions on tuning.

First—Do not hurry. Accidents may happen, strings

or pins may break when least expected, and other vexatious sources of annoyance may cause delay to your work.

For the learner, it is desirable to use the right hand for manipulating the tuning hammer and the left hand for the keys.

The right hand, then, should hold the tuning hammer on the wrest pin of the string you intend to commence with. That string will be the one belonging to treble C, so-called, which in pitch is to be brought into unison with your tuning fork. This, once determined, must be carefully guarded and verified each time you renew your work after leaving it.

Supposing the piano to be an upright one. You will first have to damper two of the C strings, as only one string can be tuned at a time. To accomplish this, insert your wedge, slanting from the right, at two or three hammers distance from the striking one, whose free movement must not be impeded.

Push the wedge in just below the hammer head and let the free end of the stick rest upon the rail upon which the hammers fall back. Be careful not to let the stick interfere with any moving parts of the action work.

Always tune first the string which is farthest to the left of the three (or two), and when that is tuned, move the wedge another string to the right. Always placing it so that it is free from the striking of the hammer, or of the under-dampers if there are any.

Why Strings Break.

Strings with two of their ends fixed on pins in a pianoforte, are of a precisely defined length, and are so arranged as only properly to give each, one particular note, and calculated to bear at the utmost a certain amount of strain, suited to give the musical sound of one designed pitch. If the string be raised beyond that pitch or if it be strained too much, the consequence is a broken string.

Sometimes the gauge numbers are written on the wrest plank, 17, 16, 15, as the case may be. Otherwise it will be necessary to take a piece of broken string to a music repair shop, that its diameter may be ascertained by the gauge.

Be careful in turning the tuning hammer that you do not turn too much at one time, and do not bear down upon the hammer, or you are liable to snap one of the wrest pins.

The first string to be tuned is the string of this treble C, that is nearest the bass. Tune it in unison to your tuning fork. Strike the prong of the fork upon something padded on your knee or a leather chair. Striking it upon hardwood is not advisable.

The next to be tuned is its second string and then its third string (if a trickord, both in unison).

In tuning to the fork, observe what difference in pitch exists between the fork and string. Then turn the

hammer a little to the left to flatten the pitch. Now turn your hammer to the right gently, and by almost unperceptible degrees, holding it level and not resting upon it. Listen attentively, and as the pitch approaches nearer to coincidence, a number of strong, rapid pulsations will be heard, and as the string is gradually tightened, these will succeed each other more and more slowly, and at last merge into gentle undulations, which will in the end give place to one continuous steady sound, the two originally distinct sounds becoming as one.

In tuning the unisons, there is the same progression from confused sounds to strong beats, and finally a blending into one smooth uninterrupted sound.

These graduations should be clearly observed by the ear, and be thoroughly impressed upon the mind, for upon the ready recognition of these mechanical means the art of tuning depends. And without a clear understanding of this process by degrees, this transition from dissonance to consonance, it is physically impossible, even with the finest musical ear, to tune a piano-forte.

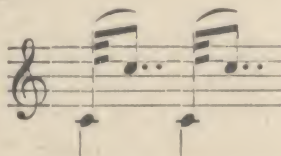
The octave below, or middle C is next tuned. This is the next step in training, after the unison and like them the octave must be absolutely perfect.

Here, the sound, though no longer identical as unisons are, have so strong a resemblance that when struck together, and perfectly in tune, they seem to be but one simple sound—the lower one, as it were, absorbing the other.

The same succession and graduations of beats will

be observed, the same waving and ultimate coalescence as in tuning the unison.

As the strings will be subjected in playing to strong blows, so in tuning they should all be put to a like test if they are to be left standing in tune; therefore, strike the octave firmly, the notes several times in quick succession, thus:



at the same time holding the bottom note down. And after again striking them together, listen keenly to catch any indication of error, and test the truth by interposing the fourth as previously admonished.

The next step is tuning of the fifth, and some time may be spent in practising the interval first as a perfect fifth, and again as a tempered or flat fifth.

Having acquired a steady command of the hammer by the hand, the student will next undertake the more serious branch of the work.

Laying the Bearings.

As one octave is the pattern of all octaves upon the keyboard of the pianoforte, the gradations to be observed in tuning and tempering the twelve notes of one octave, are merely espied in the twelve notes of both higher and lower octaves, and the judgment of the tuner therefore concentrates itself upon the process in or about the central octave, which process is termed "laying the bearings."

Laying the bearings, or laying the scale is done upon two distinct methods, the short method constituted of a succession of fourths and fifths only, and a longer method which includes intervening octaves to each, and a surer method for beginners.

Highly practised tuners prefer the short method as they can accomplish it in less time.

Tune the fifths perfect, or else you may be deceived by getting the beats the wrong side of the interval, and sharp instead of flat.

Scheme for Tuning

UPON THE SYSTEM OF EQUAL TEMPERAMENT.

The scheme of fifths, with octaves.

Fork Pitch

	1	2	3	4	5

6	7	8	9	10	11	12

Here only the sharp sign is used, prefixed to each note singly as it arises; cancelling signs are considered unnecessary, the similarity in the indication is an aid in following the scheme throughout the scale.

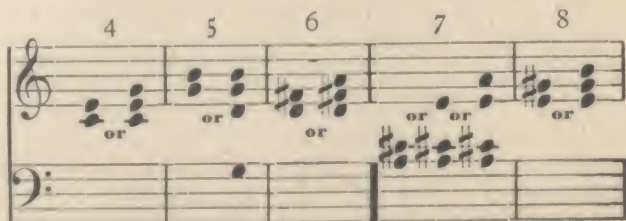
As will be seen every note in the compass from F in the bass to treble C has been including in the tuning, consequently if the adjustment of the fifths and

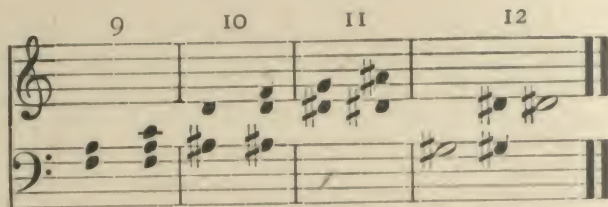
octaves has been accurate, every interval will have been correctly tuned, and when to these all octaves above and below are added, the tuning of the piano-forte will be complete.

You will probably have to go over the bearings several times before it will be safe to assume the correctness of them, and it would be a waste of time to be tuning the remainder of the octaves until this ground work was satisfactory. For in this one octave is the pattern or model to which all the other octaves are as copies.

It is customary to try by ear the suitability of the condition of each chord as the notes become available. Thus, the correctness of the notes forming the fifth No. 4, is ascertained by associating it with the C below it, and observing when struck together whether these notes produce a major third, somewhat more sharp than perfect, but still sufficiently near consonance to pass as agreeable.

These trials, as they are called, afford at each a check by which the correctness of the progress may be indicated, or unfortunately, probably the incorrectness of your first estimate of "how much" and "how little."



Scheme for Tuning.

The last is the severest test, as the two notes of which this fifth are formed have been obtained by different series of fifths, and any imperfection in the gradation of the beatings allotted to the previous fifths will manifest itself here.

When the bearings are laid with sufficient accuracy only octaves remain to be tuned, which must be done in the following order, every note to be firmly struck.

Notes to be tuned.

Notes already tuned.

and so on to the ends of the keyboard.

Notes to be tuned.

The diagram shows two systems of musical notation, treble and bass. The top system shows notes to be tuned (F#, C#, G#, D#) and notes already tuned (F, C, G, D). The bottom system shows notes to be tuned (F#, C#, G#, D#) and notes already tuned (F, C, G, D). The notes are: F#, C#, G#, D#.

Before the instrument is considered thoroughly tuned each upper note should be compared with its double octave below, and similarly, each bass note with its double octave above. This is the surest way of detecting inaccuracies which are often the after effects of the strain exerted by accumulated pressure at various portions of the instrument, consequent upon all the notes having been brought up to pitch—and thus a disturbing influence has been exercised upon the tunings previously left satisfactory.

Care and Repair of the Pianoforte.

Previous to commencing the tuning, it is desirable to carefully try over the pianoforte, note by note, in order to detect the existence of any unpleasant effect in the instrument apart from the condition of its tuning—for sometimes a jarring may be heard at a particular note, or a note may be observed which, not obviously out of tune, may seem faulty and always sound disagreeably.

The probability is that the defects noted are inherent in the structure, defects which sometimes may be modified or removed, but more frequently remain stubborn.

Heat, moisture, dirt, insects and misusage by servants and children are among the active agents which put a pianoforte out of order.

Nothing is more fatal to a pianoforte than to give it a place against a damp wall or in a permanently damp room. In the same way, exposure to heat so as to effect its surface sensibly to the hand, is likely to exercise too drying an influence on its materials.

Leaving a pianoforte open while sweeping, or exposed to a draft of dust from without, will soon cause an accumulation of dirt sufficient to injure its tone or impede its action.

These causes are easy to appreciate, and the remedy for them will readily occur without any special instructions.

But the pianoforte, like a clock, is liable from use

and the operation of other causes, to become more or less deranged in its mechanical construction, requiring a knowledge of its mechanism and some mechanical skill to correct it.

A key may stick—that is, remain down, or not act promptly. This is generally caused by tightness on the pin on which it works, and by other obstructions, including dirt.

The key may also stick from contact with another key, caused by the warping of one of the keys, or by accidental derangement of one or both pins.

Be certain of either fact, and remedy the first by reducing one or both keys with a small flat file, or a small, sharp, finely-set plane. And remedy the last by adjusting the pins.

In square pianos much damage is sometimes done to the hammers, caused by carelessness in drawing out or returning the keyboard.

Be certain that none of the keys are sticking down or the hammers sticking up, and draw the frame gently out some distance by the handle. Place the left hand under the hammer rail and the right under the front of the key frame, draw it quite out and place it on a table. Be careful that none of the keys are touched in with drawing or returning as it would certainly be fatal to the hammers that may be thereby raised.

When the action is out always take the opportunity to remove dirt, dust or any other intruders. A brush with long bristles, a quill and a bellows are the tools.

Replacing a Broken String.

Take out the panel under the keyboard on upright pianofortes and pass the wire down to reach the hitch pin at the bottom; let the loop or eye which you make correspond in every way to that of the string replaced. In some pianos each string has its separate eye and hitch pin, but in many modern instruments one pin does duty for two, and the wire is passed around the pin in a continuous length forming two strings.

Thus it happens that in breaking one string you really have to replace two strings, if your model is on that plan.

A string generally breaks near the wrest pin.

It is not advisable to take the pin out, if you can get the broken coils off without doing so. But you should give the pin four or five turns back to slacken the hold. Remember the holding power of a pin is ruined if the least drop of oil or grease is allowed to get into the plank hole or upon the wrest pin itself.

Draw up the wire taut from the hitch pin, to determine the length up to the wrest pin, then allow in addition a length equal to the number of coils, three or four as the case may be. Thus you may consider three coils equal to the breadth of three fingers.

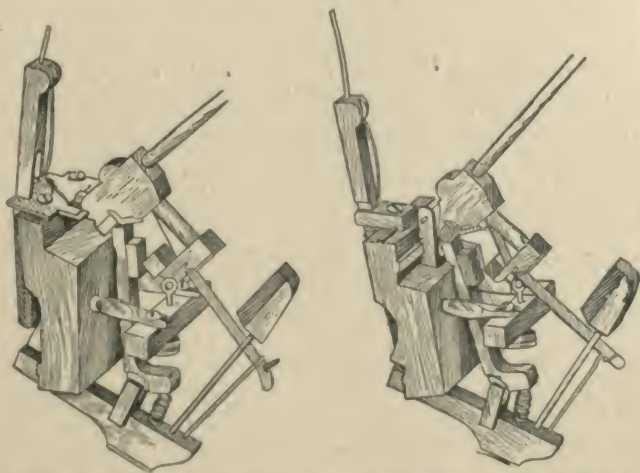
Having cut the length, pass the wire through the stud or a graffe as it is called, or pass it under the pressure bar, if that style of make is under hand. Next put the end of the wire through the hole in the wrest pin and draw up the wire fairly tight only.

You will now be able to see to fixing the string in place on the bridge pin, exactly as you see the neigh-

boring strings are fixed. Then when all seems correctly placed, proceed and draw the string gradually up to pitch. Notice that you get the same number of coils, and that these set down with the last are close to the bearing, and that the wrest pin, by pressure, goes home to the same level as those behind it, otherwise a tap from the hammer may be needed.

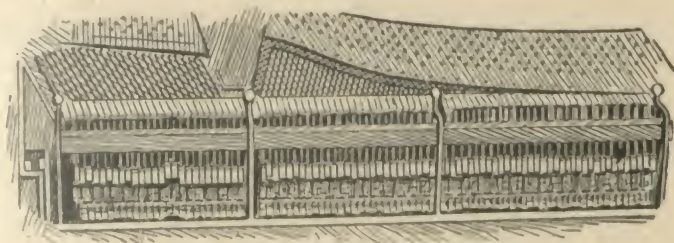
Having drawn up the string to pitch, let stand for a while, for a new string will be sure to flatten on pitch and require renewal tuning perhaps several times.

Hammers and dampers may give trouble in the tuning process by some imperfection in their action. Hammers may be out of position, striking one or two strings when they should strike two or three. This may happen in consequence of a hammer head being twisted, the glue having given way, or screw become loosened, or from other causes.

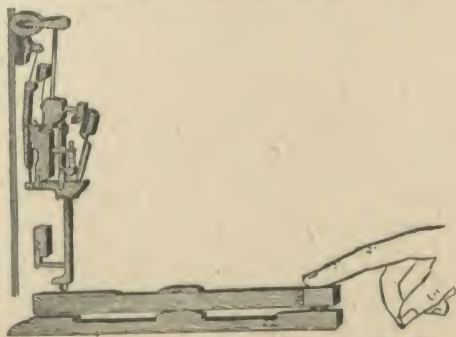


Hammer in correct position. Center pin partially out of place.

The following illustrations of a deranged pianoforte action will be of value to the student in tuning. This condition results from various causes, most of which, with their remedy, having been mentioned in foregoing portions of this work.



Action with Hammers displaced.



Showing contact of Hammer with Wire.

When the hammers are displaced in this manner we would hardly advise the amateur to meddle with them, as it will be better and cheaper to send the instrument to a professional repairer. If only one or two hammers are out of order then the amateur can probably re-adjust them without much trouble.

Additional Hints on Care of the Pianoforte.

A pianoforte whether in use or not should be open a good part of the time, otherwise the keys will turn yellow. But never let the sun shine on the pianoforte, as it will blister and turn the color of the varnish. These defects cannot be remedied unless the pianoforte is scraped and re-varnished which would necessitate a heavy expense.

Moths often cause great damage to pianofortes unobserved. A piece of camphor wrapped in tissue paper placed in a corner, and renewed occasionally, will obviate this difficulty.

A frequent cause of complaint is rattling or jarring noises. Sometimes several notes are affected and occasionally only one.

In many cases this is caused by the vibration of some article in the room. Remove one by one the pieces of bric a brac standing on the pianoforte top or mantel piece or move the pianoforte itself a few inches in various directions and the trouble will usually disappear.

TO TAKE BRUISES OUT OF PIANO OR ORGAN CASES.

Wet the part with warm water, double a piece of brown paper several times, soak in warm water and lay over the bruise. Then hold a warm flat-iron over it—*not on it*—until moisture of the paper is gone. If the bruise is not raised even with the surface repeat, but be careful to use iron only warm, or the varnish will be scorched. When perfectly dry touch up with black varnish.

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PIANO POLISH FOR OLD CASES.

Alcohol and butter of antimony, each,	1½ ounce.
Muriatic Acid,	⅓ ounce.
Linseed or Sweet Oil,	16 ounces.
Acetic Acid,	1 ounce.
Ammonia,	2 drachms.

—o—

PIANO POLISH FOR NEW CASES.

Raw Linseed Oil,	1 pint.
Common Muriatic Acid,	1 ounce.
Turpentine,	1 ounce.
Benzine or Gasoline,	3 pints.

Apply with wad of cheese cloth slightly dampened with water.

Hints on the Perservation of the Piano.

But a few words are necessary to a good house-keeper. Dust is very injurious, as it will seriously interfere with the working of the action and hammers, and, if allowed to settle upon the felt of the hammers, will in time produce a harshness of tone. When sweeping or dusting is being done, it is therefore imperative to close the piano.

LIGHT. A piano, whether in use or not, should be open a good part of the time, otherwise the keys will turn yellow.

EXTREME HEAT OR COLD should be carefully guarded against, as either may seriously injury an instrument. The action and keys and the varnish and veneering are especially liable to be affected.

DAMPNESS may cause the strings and other metal parts to rust. If possible, it is better that a piano should stand against an inside wall.

WEAR—or rather the effect of wear, will be greatly reduced if the owner of an instrument will strive to have all parts of the keyboard brought into use.

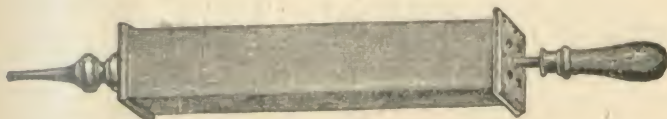
MOTHS have been known to nearly ruin a piano unobserved. A piece of camphor placed in one corner and renewed occasionally will effectually prevent trouble from this source.

TUNING is of the greatest importance. A poor or incompetent tuner may inflict great damage upon the best built piano. From two to three tunings a year should keep an instrument in nearly perfect condition.

PIANO REPAIRING TOOLS.

BELLOWS.

The action of the majority of pianos is ruined through moths and accumulations of dirt. Every tuner should carry a Piano Bellows, and by its use keep his customers' pianos in good condition.



THE ORGAN.

Its Preservation, Stops and Effects.

COMMON TROUBLES.

The two chief causes of annoyance in the use of Reed Organs, is the sticking of the keys, and the obstruction of the reeds from dust and small particles which are drawn in and lodge between the tongue and its metallic socket.

To avoid the former trouble, the instrument should be kept from exposure to dampness, but being made of well dried materials, a long season of wet weather often causes the keys to swell so that they bind on the metallic guide pins, and also the round push pins which open the valves, bind in the holes through the wood work.

REMEDIES.

To remedy the former, the keys may be detached by removing the strip of wood at the back end of the keys, and the morticed hole gently enlarged, or warmed by heating a nail of the size of the morticed hole, not to a burning heat, but sufficiently warm to dry the surrounding wood work without disturbing the usual cloth

"blushing," when it is inserted. In case of the push pin sticking, the key above should be removed, and the pin extracted, and rubbed with black lead to a smoot surface.

SILENT NOTES.

With every instrument that is made, it is the usual custom to furnish general directions in an accompanying circular, giving iustruction how to obtain access to the reeds and valves.

When a note does not sound it is usually obstructed by an atom of dust, and this is easily remedied by taking out the reed with the wire hook which is found inside each instrument. By striking the side of the socket with the reed hook, the dirt will be removed, and the tone as good as before.

If the reed is broken, a new one may be obtained from the manufacturer, by giving the name of the stop and the position on the key-board. A novice should not attempt to tune a reed, for he will be liable to destroy its "voicing" or intonation.

TUNING REEDS.

In removing a reed, there is a small projection on the nearest end for the hook to grasp, and care should be taken not to insert the hook so far as to catch on the end of the tongue and break it. A reed is made

higher in pitch by filling its flat surface near the free end of the vibrating tongue of brass, and is made lower in pitch by filling it near the heel or riveted end.

LEAKAGES.

Sometimes the wood work of the bellows or wind chest becomes cracked so that the instrument cannot be played. By taking the instrument to pieces, remembering the order in which it is taken apart, the cause may be discovered, and if there is no repairer of instruments accessible, a skilful cabinet maker can remedy the trouble.

Unless an instrument is broken by careless handling in transportation, there is no disturbance which may not be easily remedied at a small expense, as the reed organs of all standard manufacturers are well made, and are not sent away to the purchasers without being carefully tested.

JARRING SOUNDS.

When there is a rattling noise, the instrument should be carefully examined, and accessible screws tightened, and the reeds pushed firmly back in their cells, for sometimes in long journeys, where the instrument rests upon its side, the constant jar causes the reeds to slip a little from their place.

ORGAN REPAIRING MATERIAL.

REED HOOKS.



ORGAN TUNERS' CONES.

SELECTED LIGNUM VITÆ.



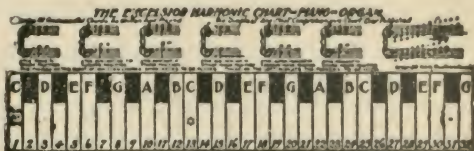
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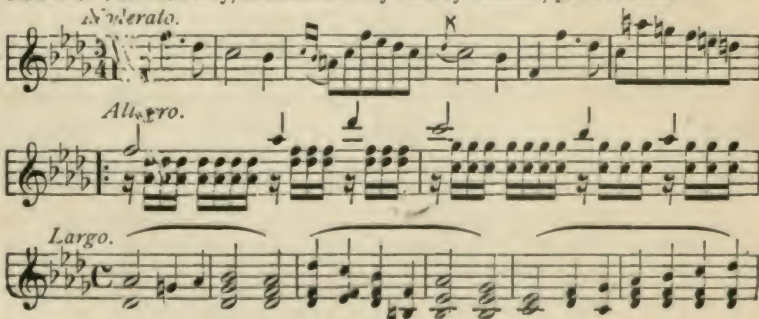
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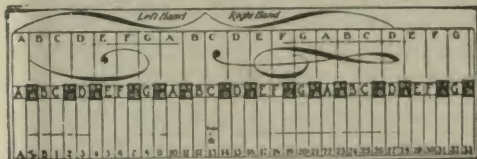
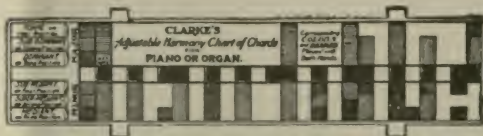
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